

FOUNDATIONS OF INVESTMENT MANAGEMENT

MASTERING FINANCIAL MARKETS,
ASSET CLASSES, AND
INVESTMENT STRATEGIES

DAVID E. LINTON, CFA

EARLY PRAISE FOR ***FOUNDATIONS OF INVESTMENT MANAGEMENT***

“This marvelous book is thorough, rigorous, and comprehensible—an unusual combination. It is an indispensable reference for both practitioners and those interested in the investment management arena. It deserves to be on the bookshelf of every serious investor. David Linton has beaten the market of investment books!”

—**William H. Miller III**, Founder of Miller Value Partners and
Former Chairman and CIO of Legg Mason Capital Management

“David Linton successfully tackles the ambitious task of providing an all-in handbook for newly minted finance professionals. The resulting volume offers extensive coverage of the theory and practice of finance, but it also avoids getting bogged down in extraneous details. Linton’s remarkable command of the material makes the exposition remarkably clear and, when mixed with some lively anecdotes, even entertaining. I am confident that this book will serve in the years ahead as an essential guide for folks who are new to the industry, as well as for those who have labored on trading floors longer than they might care to admit.”

—**Nathan Sheets**, former Under Secretary of the U.S. Treasury for International
Affairs and Director of International Finance at the Federal Reserve Board

“David Linton is the epitome of a scholar practitioner. He understands the theory, the real world, and how the two interact. *Foundations of Investment Management* is a comprehensive examination of the process of investing, covering the key investment instruments, the markets they trade in, and their role in portfolio construction. Although detailed, it is written in a style that is accessible to non-professionals. Experienced investors will also benefit from insights on the interrelationships between macroeconomics, regulators, and markets and how the keen mind of an experienced investor thinks. This book will benefit anyone looking to improve their knowledge of, and skill at, investing.”

—**Stephen G. Moyer**, CFA, Adjunct Professor, University
of Southern California, Author of *Distressed Debt Analysis*

“This book gives the reader an essential inside look at the investment industry from someone whom I have had the pleasure working with ‘in the trenches.’ It’s an accurate, timely, and very readable account of how different pieces of the financial markets, policy making, and investment community come together to create today’s market ecosystem. Even more important, the book brings vividly to life the individuals, companies, and policymakers who are behind some of the most important and consequential decisions that will impact our investment future.”

—**Vineer Bhansali**, PhD, Founder and CIO, LongTail Alpha, LLC.
Former Managing Director and Head of Quantitative Portfolios, PIMCO

“David transforms the theoretical concepts of finance into practical investment material. In the current environment of low interest rates and record high equity markets, David’s framework provides a useful guide to navigate the treacherous financial waters of passive and active portfolio management.”

—**Ben Emons**, Managing Director, Medley Global Advisors, Author of *Mastering Stocks and Bonds*, *The Financial Domino Effect*, and *The End of the Risk-Free Rate*

“*Foundations of Investment Management* is an ideal balance of breadth and depth; it covers all the critical areas in which a successful asset manager must be proficient while not burying practitioners in technical details. Additionally, reader-friendly anecdotes highlight and simplify complicated principles and each chapter closes with investment implications that ensure the content is actionable. This book is perfect for both seasoned professionals as well as students of the investment management industry, and it is a must read for onboarding investment professionals entering the industry.”

—**Bob Greer**, Scholar in Residence, J.P. Morgan Center for Commodities at the University of Colorado Denver Business School, Senior Advisor at Core Commodity Management, Author of *Intelligent Commodity Investing*

“*Foundations of Investment Management* is an unparalleled volume that is based on well-researched finance principles, but mixes in rich, on-the-ground knowledge from leading practitioners. This book brings in the best of both worlds. The end result is a one-stop shop of investment knowledge. You can save money and space on your bookshelf by having this one volume replace other texts. This is the new go-to book for students, academics, and seasoned professionals.”

—**Dominic Garcia**, Chief Investment Officer, New Mexico PERA

“David Linton has compiled a very thorough guidebook to the asset management business in *Foundations of Investment Management*. He offers an extremely user-friendly overview for new investment professionals, those interested in pursuing an investment career, or seasoned professionals who want to better understand how capital markets operate. The book is laid out logically and each chapter stands on its own. Readers will appreciate the friendly and fun approach that David takes to effectively articulate complex subjects.”

—**Michael Skillman**, Chief Executive Officer,
Cadence Capital Management

“*Foundations* provides a great starting point for young professionals looking to understand both the breadth and details of investing. David does a wonderful job blending a practitioner’s application with academic theory. The stories are thoughtful and bring to life so many things we hear in the financial press. Having been in the investment industry for over 20 years, resources such as this are hard to find and much needed.”

—**Dominic Nolan**, Senior Managing Director, Pacific Asset Management

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DEDICATIONS

First, to my beautiful wife, Laura—without whom this book would never have been written—I am immensely grateful for the support you have given me and the love and guidance you have given our children.

Second, to my amazing children, Leah, Joshua, and Matthew—without whom this book would have been written two years earlier—I wish you to be good, brave, and happy. Watching you grow has brought me immense joy, and I hope one day you might dust off this book, browse through it, and ask me about it.

Finally, to my readers—without whom this book would have no utility—I appreciate that you have decided to spend your personal time reading this work, and I hope you gain some insights that might help you further your careers and serve your clients.

CONTENTS

Foreword	xv
Preface	xvii
Acknowledgments	xix
About the Author	xxiii
WAV™ Page	xxv

PART I—Markets, Vehicles, and Participants 1

Chapter 1: Financial Assets and Capital Markets	3
Financial Assets: Bonds, Stocks, and Derivatives	4
Bonds—What Are They?	4
Bonds—Evolution of Investment Structures	8
Bonds—Who Issues and Purchases Them?	11
Stocks—What Are They?	13
Stocks—Who Issues and Purchases Them?	16
Derivatives—What Are They?	19
Derivatives—Who Issues and Purchases Them?	24
Capital Market Benefits	24
Capital Market Risks	26
The Subprime Mortgage Crisis	26
The Syndicated Leveraged Loan Market	28
U.S. Government Debt	29
Market Efficiency and Capital Market Failures	31
Summary and Investment Implications	33
Summary	33
Investment Implications	34
Citations	38

- Chapter 2: Investment Vehicles. 41**
 - Mutual Funds 42
 - Open-End Funds 51
 - Closed-End Funds 51
 - Unit Investment Trusts 53
 - Exchange-Traded Funds 53
 - Growth of the Mutual Fund Industry 54
 - Benefits of Mutual Funds 57
 - Disadvantages of Mutual Funds 59
 - Shareholder Fees (Generally One-Time Fees) 59
 - Annual Fund Operating Expenses (Generally Ongoing Fees) 59
 - Target Risk (Lifestyle) Funds 62
 - Target Date Funds 64
 - Annuities 66
 - Private Investment Companies 68
 - Separately Managed Accounts 70
 - Summary and Investment Implications 71
 - Summary 71
 - Investment Implications 71
 - Citations 72

- Chapter 3: Institutional Investors 79**
 - Institutional Investors 80
 - Corporations 82
 - Endowments 84
 - Pension Plans 87
 - Commercial Banks 91
 - Insurance Companies 94
 - Mutual Funds and Hedge Funds 97
 - Family Offices and Ultra-High Net Worth Individuals 99
 - Summary and Investment Implications 102
 - Summary 102
 - Investment Implications 102
 - Citations 104

- Chapter 4: Global Central Banks and the Federal Reserve. 109**
 - Brief History of the Bank of England and the Federal Reserve 110
 - The Federal Reserve and Other Global Central Banks 112
 - Central Bank Objectives 112
 - Meetings, Policies, and Statements 112
 - Answering the Three Most Important Questions 114
 - Implementing Federal Reserve Policy 118

Open Market Operations	118
Discount Window Lending	122
Excess Reserve Targeting	123
Reserve Requirements	127
Forward Guidance	129
Asset Purchases	130
Putting It All Together: The Federal Reserve’s Balance Sheet	132
Central Bank Transmission Mechanisms	134
Normalizing Monetary Policy	136
How Will the Federal Reserve Intend to Unwind Its Exceptional Policy Accommodation?	136
Issues the Federal Reserve Will Face	138
Criticisms of the Federal Reserve	139
The Great Depression, The Great Inflation, and The Great Recession	139
FOMC Policy Following The Great Recession	141
Summary and Investment Implications	143
Summary	143
Investment Implications	144
Citations	146

PART II—Investing and Portfolio Construction153

Chapter 5: Investment Strategies	155
Investing and Speculating	156
Fundamental Analysis	157
Technical Analysis	160
High-Frequency Trading	162
Passive versus Active Investment	165
Rebalancing Strategies	169
Calendar Rebalancing	171
Percentage of Portfolio Rebalancing	172
Calendar and Threshold Rebalancing	172
Income Redirecting	173
Constant Proportion Portfolio Insurance (CPPI)	173
Insurance	174
Summary and Investment Implications	175
Summary	175
Investment Implications	176
Citations	177

Chapter 6: Equity Investing. 183

- Brief History of Equities, Equity Exchanges,
and Institutional Investing 185
 - The Origins of Equities and Equity Exchanges 185
 - IPOs and the Growth in the Equity Market. 186
 - Trading Equities, Equity Exchanges, and Dark Pools. 187
- Active Investment Approaches. 189
 - Thematic or Top-Down Investing 189
 - Fundamental or Bottom-Up Investing 190
 - Quantitative (Factor) Investing 191
- Equity Valuation. 192
 - Dividend Discount Model 192
 - The Gordon Growth Model 193
 - Two-Stage Dividend Discount Model. 193
 - DCF Analysis 194
 - Relative Valuation 196
- Portfolio Construction 199
 - Mean Variance Optimization 199
 - Conviction-Based Portfolio Construction and *Active Share* 200
- Recent Developments in Equity Investing 202
 - Passive Stock Investing: Rationale and Early Adoption 202
 - Passive Stock Investing: Growth in Passive Investing
and Their Potential Market Distortions. 204
 - Potential Future of Active and Passive Equity Investing 205
- Beating* the Market. 205
 - Circle of Competence 205
 - Invest for the Long Term. 206
 - Controlling Risk 207
- Summary and Investment Implications 208
 - Summary. 208
 - Investment Implications 210
- Citations. 210

Chapter 7: Fixed Income Investing. 213

- Brief Review of Bonds and the Yield Curve. 214
 - Bond Features 214
 - Bond Valuation: Present Value of Cash Flows. 215
- Sources and Measurements of Risk and Return 216
 - Bond Return Metrics: Yield, the Yield Curve, and Total Return 216
 - Bond Risks: Changes in Interest Rates 218

Bond Risk Metrics: Duration and Convexity with Option-Free Bonds	219
Bond Risk Metrics: Duration and Convexity for Bonds with Embedded Options	221
Bond Return Metrics: Credit Spread.	221
Bond Credit Risk	223
Bond Credit Risk Metrics: Credit Spread Duration and Credit Rating	224
Other Sources of Bond Return and Risk	227
Types of Bond Issuers	228
Treasury Securities.	229
Agency Debt Securities	231
Municipal Bonds	232
Corporate Bonds	233
Mortgage-Related Securities.	235
Asset Backed Securities.	238
Global and Emerging Markets	240
Sources of Incremental Fixed Income Return	241
Illiquidity Premium	242
Credit Premium	243
Duration Premium.	244
Other Sources of Incremental Return.	244
Active Fixed Income Portfolio Management: Optimization and Outperformance	246
Steps One, Two, and Three: Total Return and Marginal Carry Calculation	246
Steps Four and Five: Tracking Error and Rank Order of Trades	247
Step Six and Beyond: Portfolio Iteration	250
Continuous Optimizations and High Conviction Forecasts	251
Summary and Investment Implications	254
Summary	254
Investment Implications	254
Appendix A: Bond Math Examples.	255
Citations.	259
Chapter 8: Real Asset Investing	263
Introduction	263
Brief History of Real Assets, Commodity Exchanges, and Commodity Investing	265
Brief History of Real Assets	265

- Development of Commodity Exchanges and Incorporation
of Commodity Speculation 266
- The Adoption of Commodity Investing 267
- Commodities: Energy, Metals, and Agriculture 269
 - Energy 269
 - Metals: Industrial and Precious 271
 - Agriculture 272
- Drivers of Commodity Investing Return 273
 - Key Terms: Spot, Futures, Contango, and Backwardation. 274
 - Commodity Investment Total Return. 275
- Active Management of Commodity Futures Investments 278
 - Commodity Curve Opportunities 279
- Relative Value and Substitution Opportunities 280
 - Other Opportunities 281
- Real Estate 282
 - Real Estate Overview. 282
 - Investment Considerations. 283
 - Investment Vehicles 286
- Summary and Investment Implications 287
 - Summary 287
 - Investment Implications 288
- Citations. 289

Chapter 9: Hedge Funds 293

- Hedge Funds: Overview and Brief History 295
 - Brief History of Hedge Funds 296
 - Recent Growth and Maturation of the Industry 297
 - Who Invests in Hedge Funds? 299
 - Different Types of Hedge Funds 299
- Equity Hedge. 301
 - Who's Who in the Equity Hedge Category 302
 - Equity Hedge Performance. 304
 - Equity Hedge Pros and Cons 306
- Event-Driven Funds. 308
 - Who's Who in the Event-Driven Category. 309
 - Event-Driven Performance. 311
 - Event-Driven Pros and Cons 313
- Global Macro 315
 - Who's Who in the Global Macro Category 316
 - Global Macro Performance. 318
 - Global Macro Pros and Cons 320

Relative Value	322
Who's Who in the Relative Value Category	323
Relative Value Performance	324
Relative Value Pros and Cons	327
Future of Hedge Funds	327
Alphas, Betas, and the Wisconsin/New Mexico Model	328
Summary and Investment Implications	330
Summary	330
Investment Implications	332
Chapter Appendix	334
Citations	339
PART III—Recent Advances in Finance and Investing	345
Chapter 10: Factor Investing and Smart Beta	347
Factor Investing	348
Commonly Utilized Factors	349
Factor Returns	350
History of Factors within Academia	354
History of Factor Investing Outside Academia (i.e., Today's Major Practitioners)	358
Academics Pondering: Why Do Factors and Factor Returns Exist at All?	362
Practitioners Pondering: Does Factor Timing Add Value?	363
Smart Beta Industry Review	366
Smart Beta and ETFs	367
Smart Beta Products and Their Factors	368
Smart Beta Fees	369
Smart Beta Product Returns and Criticisms	370
Institutional Adoption	374
Summary and Investment Implications	374
Summary	374
Investment Implications	376
Citations	377
Chapter 11: Behavioral Finance	383
Brief History of the Behavioral Economics Field of Study	386
Current Theory of the Causes of Behavioral Biases	391
Biases and Nudges	391
Loss Aversion	392

- Anchoring Bias 392
- Availability 392
- Optimism and Overconfidence 393
- Representativeness* 393
- Status Quo Bias 394
- Framing 395
- Herd Mentality 395
- Heuristics, Heuristics, and More Heuristics 395
- Behavioral Bias Case Studies 396
 - Case Study 1: Bill Ackman—The Herbalife Short 396
 - Case Study 2: Bill Miller—The Bear Stearns
(and Other Financials) Long 402
- Addressing Behavioral Biases 407
 - Choice Architecture 407
 - Decision Discipline: Questions for Others 409
 - Decision Discipline: Questions for Ourselves 410
- Summary and Investment Implications 411
 - Summary 411
 - Investment Implications 412
- Citations 413

- Index 419

FOREWORD

The field of investment management is constantly evolving. From ticker tapes, to the internet, to whatever comes next, as our industry changes you must be able to change with it.

By selecting this book, you are likely relatively early in your educational journey. There is much to learn, but as you learn it's the ability to apply that information that is going to help you and your clients succeed, which is commonly distilled into concepts like generating alpha (i.e., outperforming your peers).

From that perspective, this book provides not only an excellent introduction to the field of investment management, but it also, perhaps more important, provides context on how to make this information actionable in a way that few books do (or try). While it's important to know what a stock is, for example, it's far more useful to understand how stocks or other investments come together to help clients accomplish their goals.

The “now what” is something this book constantly seeks to address . . . how do you take this new knowledge and frame it in a way that will help you generate alpha; however you define it. For example, should interest rates fall, how should the managers of a defined benefit plan respond in order to ensure the plan does not experience a shortfall in saving for their liabilities? How should investors make sense of central bank activities? If you find yourself either as an institutional investor or interacting with one, understanding their objectives and reaction functions and how they position their investments given changing market conditions is invaluable. This book provides the answers to those questions and many more, explaining in detail how to benefit from this knowledge.

Whenever you learn something, it's important to understand the qualifications of the instructor. I've had the privilege of knowing David for more than decade. He has worked in a variety of positions that provide him with a unique perspective on the fundamentals of investing, as well as how to apply these fundamentals in your career. This experience gives him insights that

someone purely from academia may not appreciate and allows him to thread theory into practice.

In closing, I love this industry and I'm excited that you want to learn more about it. The more time you spend reading books like this one the better prepared you'll be for whatever the future holds. Good luck and enjoy!

David Blanchett, PhD, CFA, CFP
Head of Retirement Research
Morningstar Investment Management LLC

PREFACE

Over the years, I've had the good fortune to work with several colleagues who composed their own books and thought pieces that brought value to their readers and investors. My objective is that this work can contribute, in at least some small way, to a body of investment knowledge that further enables investment professionals to provide valuable services to their clients. A secondary objective is to help bridge the gap between what is taught at universities or can be found in a textbook, and how investment management functions from a practitioner's perspective. Therefore, I believe this work should be particularly useful to investment professionals who are generally early in their careers and are still trying to understand how their roles fit within a broader industry.

With few exceptions, my experience of working in a variety of capacities—trading, managing portfolios, and developing products—has been positive and I consider myself to be exceptionally fortunate; the professionals with whom I've worked and the opportunities they afforded to me were truly extraordinary. While my work ethic played a role in my career progression, luck was certainly a component as well. I sincerely hope that my readers will have similar opportunities and positive experiences during their careers.

While writing this book, I surveyed nearly a hundred professionals at dozens of buy-side firms and asked them (among other things): “What do younger investment professionals with whom you work generally not know or understand (that you think they should)?” and “What did you learn later in your career that you wish you had learned earlier in your career?” I sincerely appreciate the insight and feedback they provided, which no doubt contributed to this book's content and utility. Additionally, as I composed this book it became apparent that despite my best efforts, this book would benefit from one or more individuals contributing to each chapter's content. It was at that time that I contacted several friends, colleagues, former professors, and mentors—most of whom agreed to coauthor individual chapters. Each one of the coauthors is an expert in his or her respective field, and I am thrilled to have assembled this team.

Their generous donation of time and knowledge has contributed to the depth, relevance, and utility of each chapter. My sincerest thanks.

Additionally, I hope that this book will be a friendly and fun read; each chapter can be read independently and is bookended with stories and investment implications. Additionally, I've included a plethora of anecdotes, data, and primary sources in hopes of bringing to life the most valuable and relevant trends, tools, pitfalls, and best practices. For example (and my first anecdote), not long after I started a position as a repo trader at PIMCO, I was asked to compose and distribute a note discussing the LIBOR fixing scandal. This note would be sent to the firm's global traders, portfolio managers, and analysts (about 400 in total). I dutifully composed a thorough piece, complete with a detailed history and timeline, and I sent it out. About five minutes later, Bill Gross, founder and then CIO of PIMCO (and known in the press as the *Bond King*) responded (replying all): "Gee, this is a great history lesson. But, if I wanted a history lesson, I'd read a book. What are the investment implications ??!"

At that moment, my stomach sank, but in hindsight, it was a spot-on observation. Investment management organizations should always maintain a laser-focus on ensuring everything it does is in the client's best interest. From the portfolio manager's perspective, this means that every analysis ought to have an investment implication (even if the implication is to continue to monitor until there is a future development). Otherwise, the *analysis* is just noise and functions as a distraction from the primary objective of a portfolio manager, which is generating strong, risk-adjusted returns. This is the first lesson I learned from the man who most in our industry consider to be history's greatest bond investor. With this lesson in mind, every chapter will close with a summary and investment implications.

Finally, I have been asked to state that this book does not constitute an endorsement of any of the people, products, or organizations mentioned herein. All of the opinions are my own, or those of my coauthors, and not those of any current or former employers.

Enjoy!

ACKNOWLEDGMENTS

This book has been shaped by the insight, feedback, and suggestions of countless friends and colleagues. Their contributions have added to this book's depth, accuracy, relevance, and utility. No doubt I will forget to mention someone (sorry!), but I will do my best to see that those who generously volunteered their time receive recognition. Thank you.

To begin, I would like to thank Steve Buda at J. Ross Publishing, without whom this book would have remained an aspiration and an unpublished manuscript. Steve's guidance and willingness to publish a book from a relatively unknown investment professional were paramount to this project's completion and (hopefully) success. Friend and colleague, Steve Moyer, introduced me to Steve Buda as well as reviewed early drafts of several chapters. He also kindly agreed to coauthor a chapter with me, and he and his TAs made several material edits to my chapter on fixed income. Robin Yonis, a friend and colleague, graciously provided invaluable counsel, while my manager, Matt Babcock, supported this initiative from its inception and shaped this book's outline and format.

Separately, each of my coauthors donated their time and knowledge, and in doing so, materially increased this book's value to our readers:

- Andy Ross, who was a pleasure to work with and without whom the chapter on hedge funds would have remained more elementary in content and tedious in convention.
- Ben Emons, from whom I learned much about the publishing industry as well as a thing or two about investment strategies in a zero-interest-rate environment.
- Bob Greer, whose industry experience and knowledge of commodities is second to none.
- Dan Villalon, who helped me make it through both Professor Fama's course as well as the chapter on factor investing. Both were lifts that needed a mental heavyweight of Dan's caliber.

- Di Zhou, who also helped me complete Professor Fama's course, is a fellow USC Trojan and a good friend. I hope readers benefit from her insights on stock picking because I have.
- Matt Brenner, to whom I am grateful for both connecting me with my current employer as well as elevating the discussion on institutional investors.
- Steve Moyer, without whom this book would not have come to fruition. A friend and scholar, Steve's contributions to the chapters on financial markets and fixed income were significant.

Separate from my coauthors, several friends, colleagues, and mentors reviewed draft chapters and offered both feedback and encouragement, including: Audrey Cheng, Bhanu Singh, Bill Gross, Bruce Brittain, Ivor Schucking, James Meehan, Jessie Shapiro, Nathan Sheets, Peter Bretschger, Ronit Walney, Timothy Hanlon, and Yuri Garbazov.

Next, I'd like to thank my colleagues at Pacific Life Fund Advisors, who encouraged me to advance this project and reviewed portions of the draft manuscript, namely: Carleton Muench, Howard Hirakawa, Jordan Fettman, and Matt Babcock. I would like also to thank the legal team at my former employer, PIMCO, for reviewing my manuscript for accuracy. They were professional, friendly, and thoughtful.

Additionally, I want to acknowledge the contribution from the following investment professionals. Each completed a comprehensive survey that was designed to help ensure that I would cover all topics and answer all questions pertinent to our target audience. For example, two of these questions were: (1) What did you recently learn that you wish you had known earlier? and (2) What do recently hired investment professionals not know—but should? While I couldn't incorporate every response into this work, the insight I received no doubt enhanced this book's utility, and for this I am grateful.

My thanks to: Alex Haugh, Alina Rosu, Barry Motz, Ben Emons, Bhanu Singh, Bruce Brittain, Chris Floyd, Christine Cawthon, Colleen Tycz, Dan McGee, Dan Villalon, Daniel Ong, David Blanchett, Don Vessels, Donelle Chisolm, Emanuele Bergagnini, Ivor Schucking, Jacqueline Hurley, Jay Warwick, Jordan Fettman, Keri Nuzzi, Kevin Holt, Kyle Colburn, Leo Tallon, Mani Govil, Margaret Clemons, Marshall Murphy, Matt Babcock, Matthew Cobb, Matthew Pearson, Michael Giesecke, Nick Hooten, Nikki Noriega, Peter Bretschger, Robert Lambert, Russell Shtern, Ryan Kagy, Scott Berman, Sean Barrette, Shawn Connor, Steve Moyer, Tad Young, Ted Smith, Tim Paulson, Timothy Hanlon, Tom Felago, and the seventeen people who chose to remain anonymous.

Finally, my wife, Laura, whom at the very moment at which I am writing this, is preparing dinner for three hungry children, ordering scholastic workbooks, and paying the power bill. She works far harder than I do, and her contribution to our family is far greater than I will make. She's as beautiful as the day we met, and her energy, dedication, and love for her family are inspirational. This book would not have been possible without her.

ABOUT THE AUTHOR

David E. Linton, CFA, is the Director of Portfolio Construction and Manager Research at Pacific Life Fund Advisors LLC (PLFA) and has 15 years of investment experience. He is also an Adjunct Professor of Finance and Business Economics at the USC Marshall School of Business, teaching Investment Analysis and Portfolio Management. In his current role with Pacific Life, he is responsible for the portfolio construction of the PLFA suite of asset allocation products, and he shares responsibility for the manager research and due diligence



for roughly \$40 billion in sub-advisory relationships. Additionally, Mr. Linton is a member of the PLFA Investment Committee and Asset Allocation group, specializing in fixed income, and he is the lead trader for the Pacific Funds Multi-Asset Fund. Prior to joining PLFA, Mr. Linton was a Vice President and Portfolio Manager at PIMCO. While there, Mr. Linton worked in a variety of capacities and his responsibilities included comanaging PIMCO's overnight cash investing and financing book on the Short-Term Desk, working as a sovereign credit analyst on the Emerging Markets Desk, and trading investment grade nonfinancial corporate bonds on the Investment Grade Corporate Desk. Mr. Linton was also a Product Manager and member of the PIMCO Solutions Group with a focus on tail risk hedging. Mr. Linton has a BS in business administration from the University of Southern California, graduating magna cum laude, and an MBA from the University of Chicago Booth School of Business, graduating with honors.



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Downloads for *Foundations of Investment Management* include classroom-friendly Powerpoint slides for each chapter covering main points and investment implications, simple optimization examples, a special online-only chapter of the book, and several of the book's most insightful exhibits.

Part I

Markets, Vehicles, and Participants

1

FINANCIAL ASSETS AND CAPITAL MARKETS

Stephen G. Moyer, CFA¹
Adjunct Professor
USC Marshall School of Business

David E. Linton, CFA¹
Director, Portfolio Construction and Manager Research
Pacific Life Fund Advisors LLC

J. Wellington Wimpy, or just *Wimpy*, is the memorable, bumbling, and overweight character in the comic strip *Popeye*. Desiring a hamburger to consume today, but lacking the funds to pay for the hamburger, he became known among Popeye readers for asking diner patrons to extend him a loan to pay for his dinner. The phrase, “I’ll gladly pay you Tuesday for a hamburger today,” was first used in 1932ⁱ during the Great Depression—a time when, no doubt, it was common for people to ask for loans to cover their meals. Since then, however, it has become an expression to illustrate financial irresponsibility, which Bill Gross evoked in his September 2012 *Investment Outlook*, “The Lending Lindy.”ⁱⁱ The relevance here is that Wimpy unknowingly created a financial asset when someone made him a loan to purchase hamburgers. A financial asset is a non-physical asset whose value is derived from a contractual claim. Financial assets are generally more liquid than physical assets such as real estate, commodities, or any other asset that you can see and feel. In the case of Wimpy’s transaction, another diner patron, or perhaps the manager of the diner, agreed to give Wimpy a hamburger in exchange for his promise to pay for that hamburger

¹ The authors would like to thank Tomy Duong and Amy Lin for their research support in finalizing this chapter.

in the future. Because the hamburger has value and its consumption requires repayment, this transaction includes *consideration*—meaning a contract has been created. Following Wimpy’s consumption of the hamburger, the party that extended Wimpy the loan now has a claim against Wimpy, and that claim can be transferred to another person. This makes that claim to Wimpy a financial asset that can appreciate or depreciate. Finally, looking at Wimpy’s stature, we may wonder if his consumption of a hamburger was necessary for nourishment or an ill-advised example of overconsumption made possible by his ability to find a willing lender of capital.

While a contractual agreement is universal among all financial assets, the sources from which financial assets derive their value, the terms of the contractual agreements, and the rights afforded its owners are highly variable. In this chapter, the focus will be on the three most common types of financial assets: bonds, stocks, and derivatives. Once a foundation has been established as to what these securities are, how they trade, and who participates in the issuance and purchase of them, the attention will then pivot to a more general discussion of capital markets. Specifically, there will be a description of both the benefits and risks inherent to modern capital markets and a discussion of how failures can occur while financial markets remain *efficient*. We will close with a summary and investment implications.

FINANCIAL ASSETS: BONDS, STOCKS, AND DERIVATIVES

Bonds—What Are They?

Bonds are securities of indebtedness or legal promises to make payments in accordance with contractually defined terms. Since the income opportunities they generate for their owners are typically *fixed*, unlike an equity dividend that varies with the economics of the company, the bond asset class is generally referred to as *fixed* income. Bonds have indentures, which are formal legal agreements that specify the terms of the bond and the obligations of the borrower. Usually bonds are structured so that the borrower agrees to make regular interest payments prior to repaying the principal balance of the loan, in full, at the maturity of the loan. The terms of these loans can vary including the frequency of the interest payment (monthly, quarterly, semi-annually, etc.), the rate of the interest payment (1%, 3%, 8%, etc.), the size of the loan (\$1 million, \$1 billion, etc.), and the term of the loan (overnight, 5 years, 30 years, etc.). Other aspects of bonds include seniority (if there are multiple debt holders higher or lower in a capital structure), collateral (if there are assets pledged as collateral to the bondholder), and covenants (requirements of the borrower to

follow guidelines, such as limiting the future issuances of debt). Bondholders have broad legal rights that are specified in the indenture (contract) between the issuer of the debt and the purchaser of the debt, and this indenture must comply with the provisions in the Trust Indenture Act. The Trust Indenture Act of 1939 requires, among other things, the appointment of an independent trustee. The trustee has several responsibilities including monitoring the borrower's compliance with the terms of the indenture, representing the bondholders, and facilitating the ability of bondholders to take coordinated action such as making an amendment or declaring a default.

Bondholder legal rights fall into three categories including:ⁱⁱⁱ

- *Financial terms*: these terms specify most of the economic characteristics of any given bond and its valuation. The most critical terms are the bondholder's right to receive periodic interest payments and a principal payment at the maturity of the bond. Other common terms may include call provisions (allowing the company to repay the bond early), put rights (allowing the bondholder the right to demand early repayment), mandatory partial-redemptions (requiring the company to periodically repay a portion of the bond prior to its maturity), conversion rights (allowing the bondholder to exchange bonds for corporate equity), and subordination clauses (reducing the bond's claim status to other lenders).
- *Protective covenants*: these are essentially promises by the borrower that are designed to manage the risk of the lender. They are intended to enhance the likelihood that bondholders receive contractually specified interest and principal payments by limiting certain activities of the borrower following the issuance of the debt. Common covenants include debt restrictions (limits on future debt issuances to protect against the firm becoming overleveraged), dividend restrictions (limits to ensure cash or other assets are not inappropriately distributed to equity holders to the detriment of bondholders), and a broad variety of other limitations such as restrictions on asset sales, mergers, liens, sale/leasebacks, and transactions with affiliates. All of these actions could potentially impair the bondholder's rights or status.
- *Miscellaneous provisions*: these provisions specify a variety of bondholder rights and trustee obligations and can be thought of as *housekeeping* items that don't neatly fit in the two aforementioned categories. For example, these provisions include the right to receive a notification of default or special payment.

Until the early 1980s, bonds issued pursuant to an indenture were documented via an elaborate paper certificate that was physically transferred when the bonds were traded. Additionally, if the bond made periodic interest payments, the certificate would then come with smaller *coupons* that were typically attached to

the larger paper certificate, as shown in Figure 1.1. These coupons could be detached from the paper certificate and then presented to a designated bank window or mailed to a processing center following their payment dates. From this process comes the expression *clipping coupons* to describe purchasing a bond with the intention of regularly receiving interest payments.

The monitoring of each security’s principal and interest date, collecting coupons, and endorsing certificates for transfer was a highly cumbersome process. To address this, and several other problems associated with physical stock and bond certificates, the Depository Trust Company (DTC) was formed to act as a centralized clearinghouse. As of July 2017, DTC was responsible for the custody of \$52.4 trillion in securities issued in 131 countries and territories.^v Beyond the

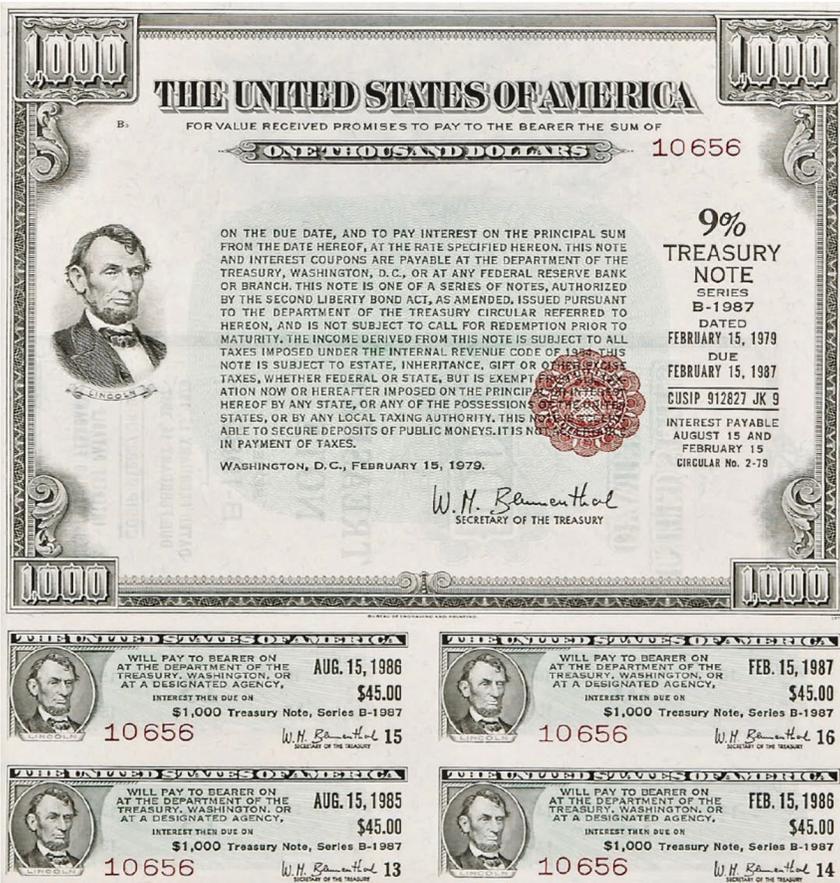


Figure 1.1 8-year, 9% U.S. Treasury Note, issued February 15, 1979. *Source:* The Joe I. Herbstan Memorial Collection of American Finance^{iv}

efficiency provided by DTC, in 1982, to reduce tax evasion, the U.S. Congress passed the Tax Equity and Fiscal Responsibility Act (TEFRA) which restricts the issuance of debt instruments in bearer form.^{vi} As a result, the use of paper bond certificates in the United States has mostly ceased and digital records of bond ownership have become the norm. Currently in the U.S., banks or other institutions hired to take custody of assets are responsible for maintaining electronic records of the ownership of the financial assets.

As will be discussed more fully in Chapter 7, the value or price of a bond is a function of its coupon relative to the yield to maturity² of other comparable risk bonds. For example, if the current 5-year Treasury note had a coupon of 3% and was trading at 100,³ then another Treasury note with five years of remaining life that had a coupon of 4% would trade for more than 100—or above par. Why? Well if the bonds were otherwise identical except for the coupon, all investors would prefer the 4% coupon bond. Their demand for the bond would cause its price to increase to the point (approximately 104.5) where its yield to maturity was equivalent to the 3% bond.

When new bonds are issued, their coupon is typically set at a rate such that the bonds will sell for 100 or at a slight discount. To determine the appropriate coupon, investment banks and governments solicit orders from investors to determine, given the market circumstances at that moment, what coupon is required to entice investors to pay par. The reason for this is simply that if the borrower is going to issue \$1 billion in bonds, it typically wants \$1 billion in cash.⁴ After the bond is issued, its future trading prices will remain a function of its coupon relative to the yields at which other similar risk and maturity bonds are trading in the market. If market interest rates rise, the price of the bond will fall, and vice versa. Investors have almost innumerable bonds among which to

² The concept of yield to maturity (YTM) will be developed more fully in Chapter 7. Suffice it to say here that YTM is the discount rate that causes the present value of all future coupon and principal payments to equal the bond price. As the discount rate or YTM increases, the present value of such payments declines; hence, the value of the bond will fall. When yields decrease, the opposite is true.

³ If the current price of a bond is equal to the principal that the bond will pay at maturity, it is trading *at par*. Because the price of a bond is quoted as a percentage of par, a bond trading at 101 means the purchaser will pay 1% more for the bond today than they will receive at maturity.

⁴ It should be noted that bonds are occasionally sold at nontrivial discounts. The best known of these are 0% coupon bonds that sell at significant discounts, pay no interest during their life, and then par at maturity. One might wonder why firms don't issue bonds using higher coupons that would cause them to be issued for greater than 100. This would basically represent the lenders paying more at issuance and collecting *excess* coupons over the life of the issue. While investors should be essentially indifferent, the long-standing convention in the market is that new issue bonds are sold at par or at a slight discount, but hardly ever at a premium.

choose, thus the market is in a constant state of finding an equilibrium where bonds all trade at equivalent risk-adjusted rates.

Bonds—Evolution of Investment Structures

While bonds are the most common form of debt instrument that are used to borrow money, there are two other relatively recently developed instruments that should be briefly discussed: syndicated bank loans and securitizations.

When most people think of a loan, they think of a bank loan. Loans provided by banks are still an important source of capital to companies, and loans are also the most common structure used in financing the real estate market. While there are some important legal differences between bonds and loan structures, they function similarly. Historically, a bank loan was a bilateral transaction between the bank and the borrower. The borrower, which could be either an individual or a company, could simply approach a branch and essentially fill out an application. A loan representative would ask a lot of questions and perhaps verify some financial information and thereafter a decision whether or not to make the loan would be made. If the loan was particularly large and thus represented a concentration risk to the bank, several banks might team up to share the risk. As transaction sizes grew, banks developed a new structure to distribute the risk—called *syndicated loans*. In a syndicated loan, the loan is divided into \$1 million units and then those units are sold to a large number of investors, which is similar to a bond offering. During the origination of a syndicated loan, the role of the originating bank is to negotiate the loan terms and then find other investors to purchase the loan; this is in contrast to the more traditional role of a bank, which is to both underwrite and fund the loan. Because of the relatively modest unit size and a relatively large and diverse number of investors who are familiar with the loan's characteristics, syndicated loans now trade actively in the secondary market.

There are two important differences to note between syndicated loans and bonds. First, while a bond typically has a fixed interest rate over its lifetime (e.g. 8.0%), loans are structured with an interest rate that changes, or floats, depending on market interest levels. Banks adopted floating rate structures to help them manage interest rate risk. Banks partially fund themselves by borrowing funds for as little as a single night. Because a bank's funding costs are a function of interest rates on any particular day, bank funding costs are variable. A bank couldn't prudently take the risk of making a 5-year loan at a set interest rate if there was a risk that its own borrowing costs could rise above the rate it received on the loan. To mitigate this risk, banks structured loans such that the loan interest rate would adjust as short-term interest rates changed. Historically, banks used the London Interbank Offered Rate (LIBOR) as a standardized measure of

short-term interest rates.⁵ When a loan interest rate was specified, it would be LIBOR plus an additional interest premium, called spread, to provide the bank a profit margin and compensate it for the credit risk. For example, the loan could be priced at LIBOR + 2.5% (or 250 basis points). If LIBOR equaled 1%, the interest rate on the loan would be 3.5%, but would adjust as frequently as monthly or quarterly to reflect changes in LIBOR. The fact that loan interest rates move in tandem with the market means that the price volatility of loans (i.e., the risk that the loan will increase or decrease in price because of changes in market interest rates) is much lower than that of fixed coupon bonds.

The second important difference is that syndicated loans, particularly if they are issued with a credit rating of BB or lower (which are commonly referred to as *leveraged loans*), are almost always secured by a lien on the assets of the issuer. In contrast, most bonds, especially those of governmental entities and companies with credit ratings of BBB or higher, are unsecured. In other words, if there is a worst-case default and liquidation, the unsecured creditor has no specific assets to seize to provide a recovery and will have to share whatever money may be available with other unsecured creditors. As a result of this difference, syndicated loans generally fare much better in bankruptcy compared to unsecured bonds of the same issuer.

The other relatively new class of debt securities is called a securitization. While there are numerous forms, in general, a securitization involves bundling many relatively small loans into a large pool and then selling interests in that pool or portfolio to investors. Securitization was first developed for residential mortgages. Banks would make 30-year mortgage loans to individuals, typically at a fixed interest rate. As discussed before, a bank holding a 30-year fixed rate mortgage when it had variable funding costs resulted in substantial interest rate risk. In response to this, as well as several other problems, securitizations were developed. In a securitization, the bank holding the mortgages sells the mortgages to an independent, single purpose entity—typically called a special purpose vehicle (SPV). The SPV purchases a large pool of mortgages (e.g., \$1 billion in aggregate amount) and then simultaneously sells undivided interests in the pool to investors. The cash contributed by the investors funds

⁵ The primary regulator of LIBOR is the Financial Conduct Authority (FCA), a regulatory body in the United Kingdom. In July 2017, Andrew Bailey, chief executive of the FCA, announced plans that the FCA would attempt to phase out LIBOR, with banks no longer submitting daily fixings by year-end 2021. (Source: <https://www.fca.org.uk/news/speeches/the-future-of-libor>.) In response, in April 2018, the U.S. Federal Reserve began publishing a Secured Overnight Financing Rate (SOFR), which is based on the rate that large banks exchange overnight loans for U.S. Treasury collateral. The expectation is that this rate will eventually replace U.S. LIBOR as the floating reference rate utilized in bank loan, mortgage, and other financial contracts. (Source: https://www.newyorkfed.org/markets/opolicy/operating_policy_180228.)

the purchase of the mortgages. Thereafter, all monies collected on the mortgages, less certain administrative and related fees, are distributed to the securitization unit holders.

Securitization is a unique way of pooling assets and diversifying default risk. Consider an investor who wishes to include residential mortgage debt in his or her portfolio. Before securitizations, this investor would have to try to either originate or purchase single mortgages, and if the mortgage defaulted, the investor could have significant risk of loss. This exposed the investor to significant idiosyncratic risk. With securitization, because thousands of loans are pooled together, expected losses can be statistically estimated and appropriately priced by investors. Mortgages may also be aggregated from different property types and regions allowing investors to diversify geographic and other risk. Additionally, it is easier for an investor to trade an interest in a securitization in the secondary market, like a bond, which improves market efficiency. Virtually any debt instrument can be securitized. While the market began with residential mortgages, it quickly spread to other loan types—such as automobile loans and leases, credit card receivables, student loans, commercial real estate mortgages, and boat loans. There has even been a securitization based on the future royalties of David Bowie songs!^{vii}

The development of securitizations has revolutionized finance in many ways. First, it allows investors to easily invest in different asset classes on a diversified and credit-enhanced basis. Before securitizations, how could a non-bank ever invest in credit card receivables? From the perspective of the issuer, securitizations allowed the originators of the loans to better manage their balance sheets. Consider the challenge of GM wanting to finance the purchasers of all its cars. The more cars it sold, the more it would have to finance on its corporate balance sheet, which would quickly prove infeasible. With securitization, it now continually sells the new auto loans to new securitizations, essentially allowing it to quickly recycle its scarce capital. Finally, securitizations allow for various aspects or risks inherent in the underlying pool to be segmented and sold to investors who prefer certain security types. Consider a securitization backed by 30-year mortgages. Because mortgages pay down over time and mortgages are repaid in full when people move, the average life of a 30-year mortgage is only about 10 years,⁶ but there is considerable uncertainty as to exactly when an investor will receive some of the cash flows. Securitizations can alleviate this risk

⁶ This is a very general estimate. Many factors, including in particular the interest rate on the mortgage, influence its expected average life. For example, for mortgages originated in 2006 and 2007 when interest rates were relatively higher, their average life was as short as 4–5 years because when interest rates declined following the 2008 recession, homeowners refinanced their high-interest mortgages with new low-interest mortgages.

by creating different tranches or classes of securities and then channeling the cash flows pursuant to an agreed formula. So, for example, a mortgage securitization could contain a tranche or bond that would payoff in exactly three years. And because it could reduce a prospective investor's risk related to the timing of cash flows, the investor will require a lower return, which effectively increases the overall value of the pool's cash flows.

Bonds—Who Issues and Purchases Them?

According to the Bank of International Settlements (BIS) and the Securities Industry and Financial Markets Association (SIFMA), an industry trade group that represents banks and asset management companies, the size of the global bond market exceeded \$100.1 trillion in 2017.^{viii} By comparison, global total gross national product (GNP), or the value of all items produced and consumed, was \$84.8 trillion at the end of 2017.^{ix} As shown in Figure 1.2, the largest domicile, or country of issuance, is the United States, whose bond market was estimated at \$39.3 trillion (39.3%) in 2017. The European Union collectively had the second largest bond market, at \$28.2 trillion (28.1%), while Japan is the third largest bond market at \$12.7 trillion (12.6%). Emerging market bonds collectively were valued at \$14.0 trillion (14.0%), and this is the most rapidly growing market, driven largely by China's economic ascension. By comparison, in 2007, emerging markets bonds represented only 4.4% of the market.

Entities that sell bonds can be classified into three broad categories: governments, corporations, and securitization vehicles (which include mortgage-related

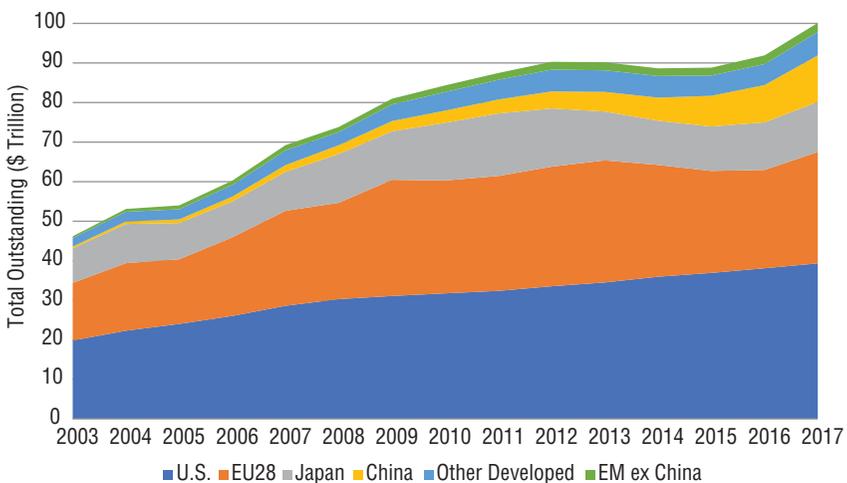
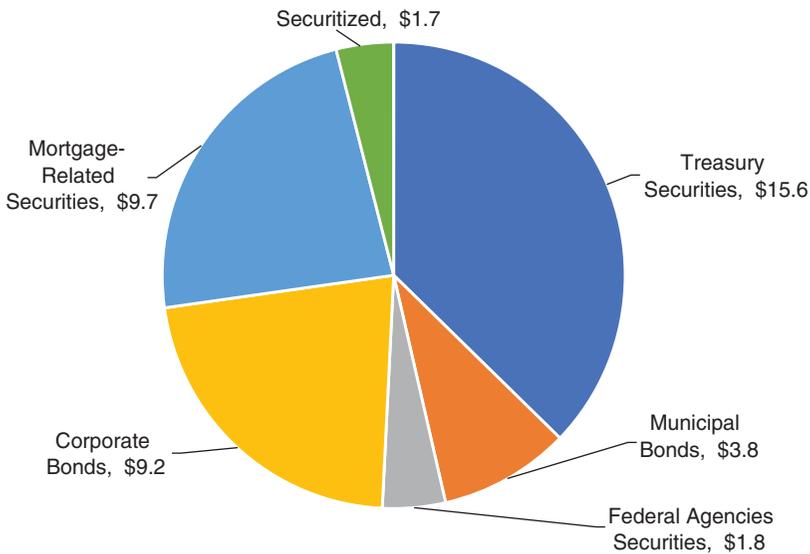


Figure 1.2 Global bonds outstanding. *Source:* BIS and SIFMA

securities). In the United States, government entities—including the U.S. Treasury, state governments, municipalities, and government agencies—are the largest bond issuers. In the third quarter of 2018, these government entities collectively issued \$882 billion in debt. Most of the debt issued was used to refinance existing debt, while the balance was to fund the gap between tax receipts and expenditures, typically referred to as fiscal deficits. The second largest category is the securitization entities discussed previously. In the third quarter of 2018, \$631 billion of securities were issued by securitization entities in the United States. Last but not least, corporations are the final major issuer of debt. Corporations issue debt for many reasons including: financing acquisitions, making capital investments in their own business, repurchasing their shares, or refinancing existing debt. In the third quarter of 2018, \$322 billion of corporate bonds were issued in the United States.^x As shown in Figure 1.3, in 2018 the stock of treasury securities, municipal bonds, and federal agency debt aggregated to just over \$21 trillion (excluding intragovernmental holdings)—or approximately 50% of U.S. debt outstanding. Mortgage-related and securitized issues have \$11.4 trillion (23%) outstanding, while corporate issuers have \$9.2 trillion (21%) debt outstanding.^{xi}



Note: Corporate equities include both listed on exchanges and closely held common and preferred shares issued by domestic corporations and U.S. purchases of shares issued by foreign corporations; mortgage-related securities include GNMA, FNMA, and FHLMC mortgage-backed-securities and CMOs and private-label MBS/CMOs; Treasury securities include only interest bearing marketable public debt.

Figure 1.3 U.S. debt outstanding (\$ trillions). *Source:* SIFMA

So who are the largest buyers of bonds after they are issued? Global central banks are the single largest purchaser of U.S. bonds, who collectively own \$6.3 trillion of U.S. Treasuries. One reason central banks accumulate U.S. Treasuries is that their home country has a balance of trade surplus with the United States so they choose to purchase U.S. Treasuries with their excess dollars. The alternative would be to exchange those dollars for their home currency, which would tend to increase the home currency's exchange rate and make the country's exports less competitive. As of January 2019, the largest holder of U.S. Treasuries (by country of domicile) is China, which held approximately \$1.1 trillion followed closely by Japan,^{xiii} which held approximately just under \$1.1 trillion.⁷ Other large purchasers of U.S. debt are individuals, some of whom buy bonds directly into their brokerage accounts while others purchase fixed income mutual funds. According to the U.S. Federal Reserve, at the end of 2017 U.S. households held \$82.3 trillion in financial assets, of which \$4.1 trillion were investments in treasuries, agencies, municipal bonds, corporate bonds, and other debt securities.^{xiii} Additional large purchasers of U.S. debt include foreign investors, endowments and foundations, pensions, and other corporations. See Chapter 3 for a detailed discussion of these institutions, their objectives, and their investment reaction functions.

Stocks—What Are They?

A business can be structured in several legal formats. An individual can start a business without any identifiable legal format. For example, someone can start a shoeshine business by simply setting up a stand, providing the service, and collecting the revenue. In that case, the business is essentially the individual. Alternatively, several people could team up to form a business—say several accountants to provide tax preparation services—and decide to establish a legal entity called a partnership. The governing documents of the partnership would define ownership, distributions of profits, allocations of liabilities, etc. These approaches worked for relatively small and simple businesses, but as business ventures grew more complicated and needed to raise capital from a large number of individuals, an alternative structure, *the corporation*, was developed. The corporation offered a number of economic and legal advantages. First, ownership of the corporation was represented by shares of stock, which represented fractional ownership interests in the firm. This allowed firms to raise capital

⁷ Note: These data are sourced from both U.S. and non-U.S. based custody accounts; non-U.S. based custody accounts may not be attributed to the actual owners. However, despite this limitation, we can infer that the vast majority of treasuries held in Chinese and Japanese custody accounts are owned by their respective central banks.

from multiple sources because they could essentially sell a potentially unlimited number of shares. Second, corporations are able to legally limit the liability of their owners to the amount invested.

Relating to this latter point, consider the dilemma of somebody financing a new air transport service intended to compete with FedEx and UPS. Shares of stock are sold to buy a plane, which is then filled with precious cargo. If the plane crashes due to pilot negligence and the cargo is damaged or destroyed, no doubt the owners of the cargo will sue for damages. If investors in the shares had to worry about this potential liability being borne by them (i.e., they had to write extra damage checks), they would likely be very reluctant to invest, particularly when they likely were not involved in the management of the business and hiring of the pilot. To eliminate these risks, corporate legal entities *shield* their owners from the liabilities of the corporation. Stock investors might lose some or all the value of their investment, but they cannot be held liable for any additional amounts. This was a key advancement that allowed capital to be raised from individuals and entities that might not be involved in the business and thus have no way to mitigate their risk.

While the corporation had certain risk mitigation advantages, it raises certain governance issues. The shoeshine stand owner and the tax accountants are actively engaged in the day-to-day operation of the business and thus all have an interest in making the business be successful. However, after a corporation sells shares to many investors who are not involved in the business, how can shareholders be certain those running the business are placing the interests of the shareholders ahead of their own? To manage this risk, corporations are structured with a board of directors who are elected by the shareholders. These directors, in turn, supervise the managers of the business. If the managers don't work in the interests of the shareholders, the directors can replace them. If the directors are inept, the shareholders can elect new directors. This system is not without its problems, but it's the best that's been devised.

Thus, to return to the question with which this section started, a share of stock is a claim of partial ownership of the corporation. As a matter of accounting parlance, that ownership share is sometimes referred to as an interest in the firm's equity. A shareholder is a person or entity that owns one or more shares of equity. Like bondholders, shareholders have broad legal rights. However, unlike bondholders whose legal rights are specified in an indenture or loan agreement, shareholders' rights are specified by the laws of the state in which they are incorporated, and are further defined in the certificate of incorporation and by-laws of the corporation.^{xiv} In the United States, and typically around the world, shareholder rights include:^{xv}

- *Economic rights*: as owners, the shareholders benefit from any improvement in the value of the corporation. Essentially, as the value of the firm

- increases, the value of the stock should correspondingly increase. In addition, shareholders have the right to receive any dividends or other distributions declared or made by the corporation.
- *Control rights*: the basic control right of a shareholder is the ability to vote their shares for the election of the company's board of directors, who in turn are responsible for the day-to-day operations of the firm. As a practical matter, the relative amount of influence of any shareholder is a function of the percentage of shares they own. Typically, in large, publicly traded corporations, no shareholder owns more than 5% of the stock. As a result, a governance issue economists call the *agency problem* exists. Specifically, it may not be in any individual's best interest to invest the time to oversee the company because the individual has limited ability and economic incentive to effect change. However, most states and corporate Articles of Incorporation require a majority of shareholders to approve certain extraordinary transactions, such as mergers and acquisitions or amendments to the corporation's Articles of Incorporation.
 - *Information rights*: although the amount of information that a company is required to provide pursuant to state statute is fairly limited, as a practical matter, most large companies have substantial disclosure obligations with owners either by contract or federal regulation. With respect to private companies, sophisticated angel, venture capital, and private equity investors will require extensive information disclosures as part of their investment agreements.
 - *Litigation rights*: shareholders may sue on behalf of the corporation, naming the firm's officers and directors as defendants, should management or the directors breach their fiduciary duties to the shareholders.

Like bond certificates, until recently, equities owners received a stock certificate at the time of purchase. These elaborate certificates were originally issued in bearer form, meaning whoever held the certificate in their possession was entitled to corporate dividends. By the 1960s in the U.S., the use of physical stock certificates began to overwhelm the processing abilities of major exchanges. The industry solution was to *immobilize* stock certificates in a central location and note the change of ownership through book entries. By 1990, the DTC held 32 million paper stock certificates in custody.^{xvi} However, like bond certificates, over the past thirty years, paper stock certificates have been rapidly eliminated and replaced with electronic records, a process known as dematerialization. As of January 2012, the DTC held only 383,400 stock certificates—down 99% since 1990. Today, stock certificates are primarily held as collectables and displayed as works of art (see Figure 1.4).



Figure 1.4 A Columbus Southern Railway Company stock certificate

Stocks—Who Issues and Purchases Them?

According to SIFMA data, the size of the global equity market reached \$85.3 trillion by year-end 2017 as shown in Figure 1.5. By comparison, this is still \$14.8 trillion smaller than the global bond market. The largest equity market is the U.S. equity market, whose value was estimated at \$32.1 trillion (37.7%). The European Union block of 28 countries comes in second with a combined market value of \$14.2 trillion (16.7%).⁸ Emerging markets ex-China are collectively the third largest equity market, valued at \$14.6 trillion (17.2%). The fourth largest equity market is now China, which is estimated at \$8.7 trillion (10.2%). The growth in Chinese stock market value has been truly remarkable. Using 2005 as a base when its value was only \$402 billion (1.0%), it has grown at an average compounded annual rate of 29% for twelve years.^{xvii}

It is important to note that the statistics presented above only relate to shares of equity traded on public exchanges, usually referred to as public equity. A

⁸ Unlike equities in the U.S., China, or emerging markets ex-China, the aggregate market value of European equities had not recovered from their pre-2008 recession peak. By comparison, in 2007 the EU equity market was valued at \$15.4 trillion (25.4%), meaning its global market share has fallen by approximately 8.7% in the 10-year period ending 2017.

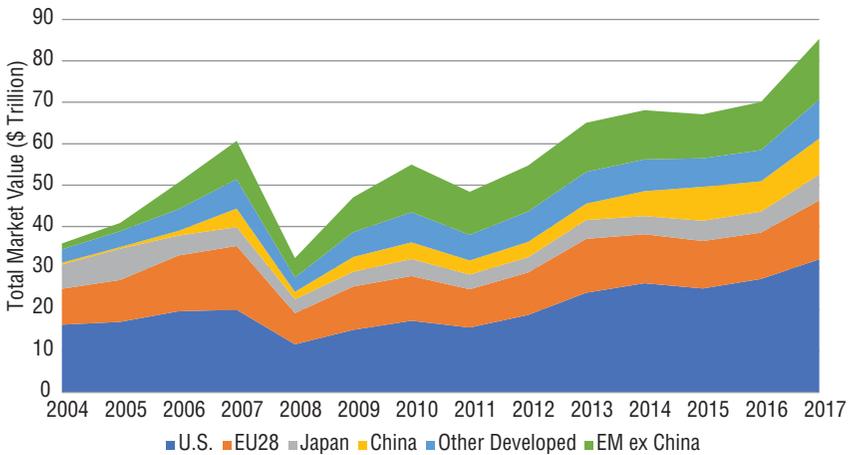


Figure 1.5 Global equity markets capitalization by country. *Source:* World Federation of Exchanges and SIFMA

significant amount of equity value is held in the form of private equity and is typically managed by either venture capital or private equity firms. These firms are often structured as limited liability entities where a professional manager identifies, executes, and manages the investments on behalf of large institutions (such as pensions, endowments, and family offices) who provide the capital. The private equity market has grown substantially in the last two decades. According to the 2018 McKinsey Global Private Markets Review, 2017 private equity deal volume reached \$1.27 trillion, up from \$190 billion in 2000. Meanwhile, committed but not yet deployed general partner capital reached \$1 trillion, up from around \$300 billion in 2000.^{xviii} Despite the size and growth of this market, private equity can still be viewed as an incubator for public equities because most companies that are held by either venture capital or private equity firms will eventually be sold to firms with public equity or will become public firms themselves.

The process by which the equity of a corporation becomes *public* is called an initial public offering (IPO). In an IPO, a corporation will engage the services of an investment bank or group of banks, called the underwriters, to help organize and market the offering. As part of this process, the firm will file a registration statement with the Securities and Exchange Commission (SEC) to *register* a certain portion of its shares for public sale. The registration statement will include a detailed disclosure document, called a prospectus, that essentially explains all material aspects of the corporation and its operations to new investors. This prospectus must be approved by the SEC, which is charged with making sure that there is sufficient information for an investor to make an informed investment decision. Once the prospectus is in near-final form, the underwriters will

then use it to market the stock to prospective investors (typically large institutions or various funds). For well-known companies (like Facebook, Google, or Alibaba) this is a very high-profile process that is closely watched by market participants. After the marketing is completed, feedback from prospective investors will be used to *price* the offering, which will determine the price at which the underwriters will sell the registered shares to the public investors.

While the corporation is private, there are significant limitations on how and to whom the shares in the corporation can be traded. Private company securities are commonly referred to as *restricted* and can only be sold to qualified investors. Following an IPO, the shares registered and sold in the offering can be purchased by anyone and the shares will typically trade freely on one of several exchanges. This opening up of the market to all investors often results in chaotic trading immediately following an IPO because investor demand for shares frequently exceeds the limited amount being offered.

While the IPO offers an opportunity for the corporation to raise cash from the public and provides early investors an opportunity to monetize their investment,⁹ it comes with a variety of trade-offs. The prospectus, discussed earlier, requires the company to make significant disclosures about its business and strategy that it otherwise might prefer to keep secret from its competitors (and potentially customers). In addition, public companies must file periodic reports with the SEC about their operating performance and governance and they are liable to public shareholders for any material misstatements in such filings. According to SIFMA data, in the third quarter of 2018, \$60.1 billion was raised by U.S. and foreign corporations in the U.S. IPO market. Secondary, or *follow-on* offerings, whereby additional shares in already public companies are sold to investors, totaled \$42.1 billion.^{xix} Do these equity issuance numbers seem small? Aggregating both initial and secondary offerings, in 2017 U.S. equity issuance was only \$199.3 billion^{xx}—less than 1% of the total U.S. equity market value. By comparison, in 2018, \$7.4 trillion in bonds were issued in the U.S.^{xxi}—17% of the total value of the bond market. The primary reason for this disparity is that equity doesn't mature, whereas bonds do. Equities are perpetual securities that remain outstanding until they are retired either by corporate repurchase, merger, or bankruptcy. Conversely, bonds have finite lives and therefore mature; so, a majority of bond issuance is to refinance or *roll* maturing debt, thereby requiring significant annual issuance to maintain a steady stock.

That's who issues equities; so, who owns them? Steven Rosenthal and Lydia Austin of the Tax Policy Center attempted to answer that question as of the end

⁹ In an IPO of a venture capital-backed firm, the original investors will typically, for marketing reasons, be limited in how much stock they can sell in the offering. But, once the company is public, those investors can, over time, monetize additional portions of their holdings via secondary offerings or pursuant to other provisions of the securities laws.

of 2015. Using a variety of sources and assumptions, they estimated the single largest category of U.S. equity holders are U.S. households who held \$15.3 trillion in U.S. equities (67%)—either in taxable accounts (mutual funds, ETFs, or direct holdings: see Chapter 2) or nontaxable accounts (pension plans, 401k, IRAs, etc.).¹⁰ Foreigners collectively held \$5.8 trillion (26%) of U.S. stock, while U.S. institutions, including insurance companies and nonprofits, held an additional \$1.7 trillion (7%).

Derivatives—What Are They?

Derivatives are financial contracts whose value is derived from the value of another asset. These contracts have no intrinsic value themselves (unlike the way a bond or share of stock has intrinsic value); rather, its value is derived by virtue of the interrelationships specified in the contract. While there are dozens of types of derivatives, according to the BIS, the most common exchange-traded derivatives are futures and options^{xxiii} while the most common over-the-counter derivatives are forwards, options, and swaps.^{xxiii} For more information on the types of derivatives, their definitions, how they trade, how they settle, and who uses them, please see Appendix Table 1.1 at the end of this chapter.

One of the simplest derivatives to understand is a call option on a stock. A stock call option is a contract that gives the holder the right (but not the obligation) to purchase the stock for a specified price (the strike price) on a given date in the future (e.g., 30 days in the future). Assume that when the parties begin negotiating the call option, the stock is selling for \$10 and the strike price is set at \$13 and the exercise date of the option is in 30 days. The value of the option in 30 days will completely depend on the then trading price of the stock. If the stock is trading for \$13 or less, the holder of the option will not exercise the option and it is worth nothing. If the stock is trading above \$13, its value is market price—\$13. If the option costs \$1, then the buyer makes a profit only if the stock price exceeds \$14. Of course, the investor who buys the call option will have a view on the future stock price (why would they waste money on buying the call if they thought the stock would go down in price), but the value of the call option is completely dependent on the stock being greater than \$13 on or prior to the exercise date. With an *American* call option, the holder has the right to purchase the stock at \$13 at any time prior to or at the expiry of the option, whereas the holder of a *European* call option may only purchase the stock at

¹⁰ Of note: Rosenthal and Austin found that from 1965 until today, the balance of equities held in individuals' taxable accounts such as broker accounts, had fallen from over 80% to approximately 24% in 2015. Alternatively, the percentage of equities held by individuals in retirement accounts had grown from under 10% in 1965 to approximately 43% in 2015. This shift can be largely attributed to tax policies encouraging individuals' use of retirement accounts.

\$13 at expiry. This added *optionality* that is afforded to the American option raises its value relative to a European option.

One of the inherent risks to owning a derivative is the potential for a counterparty to fail to honor the terms of the contract. In the case of the call option, if the price of the stock increases from \$10 to \$20, will the counterparty deliver a share of stock in exchange for \$13? For a derivative on the company's stock, there is no claim against the underlying company. In fact, the company is unlikely to know (or care) that the call option exists. Rather, the derivative is between two parties at arms' length from the company. The mechanisms that have been developed in order to manage counterparty default risk will be discussed shortly.

Although many derivatives are now standardized, they can take any form and cover virtually anything to which the parties agree. There are two primary motivations for investing in derivatives—speculation or risk mitigation—with the later representing the vast bulk of derivative transactions. Consider a few common risks that a company might want to mitigate or hedge. A company has borrowed \$100 million using a floating rate bank loan priced at LIBOR + 4.0%, but the company has since become concerned that the LIBOR rate will increase. If the LIBOR rate should increase from, say, 2% to 10%, the borrowing cost of the company would increase from 6% to 14%. If this occurs, the company may not be able to pay the interest and may potentially be forced to declare bankruptcy.

In order to hedge against a rapid rise in the LIBOR reference rate, the company could enter into a derivative contract called a fixed-for-float interest rate swap. If this company were to utilize this contract, the company would agree to pay a counterparty (typically a bank) a fixed rate on the \$100 million (called the notional amount) and the counterparty would agree to pay LIBOR to the company. Let's assume that the company and the bank agreed that the company would receive the LIBOR rate and the bank would pay a fixed rate equal to 3.5%. From the company's perspective, it has swapped a floating rate liability for a fixed rate liability. As a result, its financing rate has been transformed from LIBOR + 4.0% to 7.5% (3.5% + 4.0%). Through the utilization of this derivative, the company has ensured its financing cost will neither rise nor fall for the duration of the swap.

Alternatively, assume that the company is domiciled in Brazil, where local interest rates are high owing to elevated inflation. Rather than borrow at an elevated local rate, the Brazilian firm chooses to borrow in the U.S. bond market where nominal rates are lower. The Brazilian company now has currency risk. If all of its revenue and income is in Brazilian reals (BRL), how many reals will it take to buy \$100 million in U.S. dollars (USD) at the maturity of the loan to pay it off?¹¹ In this case the company might enter into a foreign exchange forward

¹¹ There, of course, is also currency exchange risk associated with each interim periodic interest payment.

purchase contract with a bank that will essentially fix the USD/BRL exchange rate on a specified date in the future.

What's the difference between a risk mitigator (hedger) and a speculator? For this discussion, the primary difference is whether the party has underlying exposure to the risk they are trying to mitigate. Imagine an airline and oil producer both enter into a contract whereby the airline is insuring against rising oil prices while the oil producer is insuring against falling oil prices. Both entities are hedging. Furthermore, in the example of the Brazilian corporation, the company borrowing the money was inherently exposed to certain risks—either interest rate risk, currency exchange rate risk, or potentially both. The counterparty on the other side of the derivative contract might also be mitigating risk or it may be speculating. For example, in the foreign currency swap, the counterparty might just have a strong conviction that the USD/BRL exchange rate will decline in the future and they'll make a profit.

Why are derivatives attractive to speculators? The basic answer is leverage. Consider the stock call option discussed earlier. If one believed that the share price was going to go from \$10 to \$20, then they could just buy the stock and potentially double their money. Alternatively, assume the call option cost \$1. If the stock goes to \$20, they will have a profit of \$6—\$20 minus \$13 (exercise price) minus \$1 option cost—and enjoy a 600% profit. Plus, if the stock falls in value to \$5, the investor who bought the stock will lose \$5, whereas the option investor is only out the original \$1 option cost. But this sounds too easy—heads you win, tails I lose? The catch, of course, is that in many scenarios, the option will expire worthless. In the example, for the option to be profitable, the stock must appreciate 40% in 30 days—a possible, but statistically improbable, scenario. Naturally, the price of the call option (or any derivative), which professionals calculate using elaborate statistical models, will reflect the probability assessment of each party to the transaction.

The leverage aspect of derivatives exacerbates the counterparty default risk that was previously mentioned. Consider the interest rate swap on the \$100 million notional amount. The terms, again, were that the bank paying LIBOR (when LIBOR is initially 2.0%) would receive a fixed rate of 3.5%. Assuming rates didn't change, this implies that in the first year the LIBOR payer would receive \$3.5 million and pay \$2 million. But what if some unforeseen economic disruption occurred and LIBOR rose to 7%? Now the LIBOR payer would be responsible for paying \$7 million and effectively losing \$3.5 million per year. If this loss¹² resulted in the default of the counterparty, this banking failure could cause a ripple effect through the broader economy. First, the borrower who was expecting to receive the 7% LIBOR payment (from the now defunct financial

¹² In reality, a major bank could easily have \$100 billion in swap exposure, which would make this a loss of \$3.5 billion per annum.

institution) is now responsible for the higher-than-expected interest payment. This unexpected increase in borrowing costs may cause this borrower to also default on its loan. The default on this loan will result in losses to the owner of the loan, and so on.

Recognizing these risks, financial market regulatory bodies have developed mechanisms that require that the parties to derivative contracts (which are generally large corporations, banks, or other financial institutions) constantly monitor the economic value of the contract, and if it becomes negative, post collateral to minimize the potential loss to the counterparty in the event of a default. The requirement to post collateral is called *margining*. How the margining mechanism works depends on which of the two ways derivatives are commonly traded. The first trade method is a bilateral negotiation and agreement of terms. This methodology is referred to as *over the counter* (OTC), and it does not involve the use of an exchange. The second method of trading involves the use of an exchange, which is an institution where standardized securities or contracts are exchanged or traded.

If two parties want to trade derivatives bilaterally, they generally first negotiate and execute an International Swaps and Derivatives Association (ISDA) master agreement. ISDA is a New York based trade organization that, among other things, works “to make global derivatives markets safer and more efficient.”^{xxiv} To accomplish this, the ISDA has developed a *master agreement*, which is a legal contract between two counterparties that specifies the terms and conditions relating to the purchase and sale of derivatives between institutions. In practice, most banks and institutions use the ISDA master agreement as a template and then further negotiate terms to reflect the unique circumstances of any particular transaction.

An important component of the ISDA master agreement is a credit support annex (CSA), which specifies the terms of margining. Under the standard CSA, margining is required when a derivative’s price changes such that should the derivative be closed, one counterparty would incur a gain and the other counterparty would incur a loss. The CSA requires a counterparty in the loss position to post collateral (such as cash or U.S. treasuries) for the benefit of the other party. If a counterparty fails prior to the maturity of the derivative, any collateral that has been posted can be immediately seized by the other party. If all counterparties in all derivative transactions were fully margined, there would be a significantly lower probability that the failure of one participant (e.g., a large bank) would cause a domino effect that threatens the entire system.^{xxv}

In practice, securities are rarely fully margined, meaning the failure of a bank will cause (albeit generally small) losses with each counterparty with exposure to the defaulted bank. Additionally, the collapse of a bank will cause a flurry of trading as counterparties attempt to reestablish positions (e.g., replace a

defaulted interest rate swap), which can lead to trading costs or losses during the period when positions are in the process of being reconstituted. For these and several other reasons, since 2009, regulators have made a concerted effort to reduce the size of the OTC derivatives market and migrate derivatives trading to exchanges. Derivative exchanges utilize a central counterparty (CCP), which guarantees the financial performance of its clearing members. When a derivative trades on an exchange, the CCP becomes the buyer to the selling counterparty and the seller to the buying counterparty. As in bilateral trades, CCPs margin positions with their counterparties daily. Should a clearing member fail to margin trades to the CCP, the CCP would declare a default and the defaulting member's collateral would be seized and its positions liquidated. Any loss associated with the default would be covered by the CCP's reserves. Important to the broader financial system, no other market participants would need to reconstitute positions because the CCP would continue to guarantee the performance of all of its remaining derivative positions. Although regulators have sought to encourage migration of trading to exchanges with CCPs, they have, at best, had only modest success, as shown in Figure 1.6. According to the BIS, for the 10-year period ending on June 30, 2018, the total notional value of exchange-traded derivatives increased \$20 trillion (26%), while the notional value of OTC derivatives declined \$78 trillion (12%), and the market value of OTC derivatives declined by \$10 trillion (49%). A major impediment to the

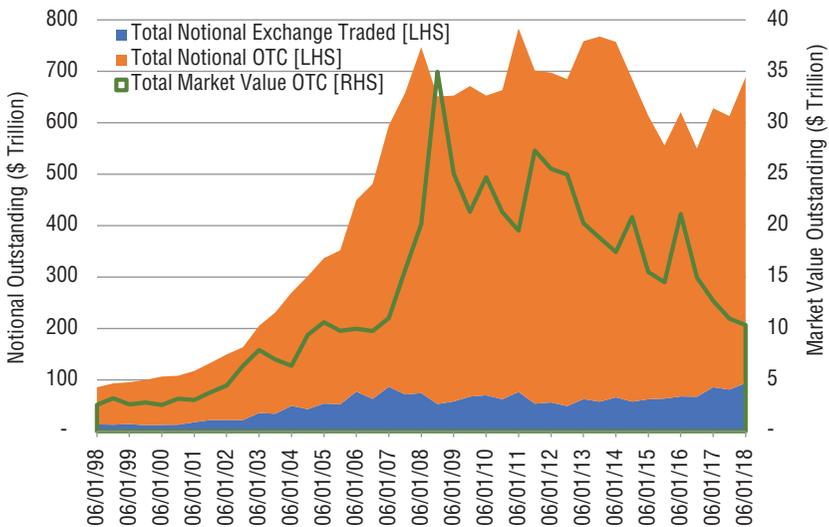


Figure 1.6 Global OTC and exchange-traded derivatives market. *Source:* Bank of International Settlements^{xxvi}

shift to exchanges is that exchanges require contracts to be standardized. However, many derivatives require significant customization (such as interest rate swaps or total return swaps), such that these derivatives need to be negotiated bilaterally. As a result, most derivatives are still traded OTC—a trend likely to continue for the foreseeable future.

Derivatives—Who Issues and Purchases Them?

So how big is the derivatives market? According to the BIS, as of June 30, 2018, the global notional value of exchange-traded and OTC derivatives exceeded \$689 trillion!^{xxvii} By way of comparison, in 2017 the global bond market was around \$100 trillion, while the global equities market was around \$85.3 trillion. So how is it that the derivatives market is $\sim 3\times$ the size of the global stock and bond markets combined? The reason has to do with how derivatives are tallied. Returning to the interest rate swap example, the contract covered a notional amount of \$100 million, which is how the BIS would have *counted* the contract. But if LIBOR stays relatively stable, the economic value of the contract would be relatively small. In most cases, the market value of derivatives contracts is far below the notional value of these contracts. In fact, the BIS estimated that the OTC traded derivative notional value was \$595 trillion, while the market value of those derivatives was only \$10 trillion as of June 30, 2018.^{xxviii}

Because of the requirement for strong creditworthiness to mitigate counterparty default risk, derivatives are largely written and purchased only by the world's largest banks and corporations. Exchanges and banks go to great lengths to evaluate and ensure the ongoing creditworthiness of their counterparties. Most individuals are insufficiently creditworthy to participate in these markets. A 2009 ISDA survey revealed 94% of the world's largest corporations use derivatives. All 78 of the world's largest banks and diversified financial institutions use derivatives, most commonly to hedge interest rate sensitivity and exposure to currency exchange rates. Insurers also commonly utilize derivatives, usually to manage exposure to interest rates, currencies, and equity prices. Finally, 93% of the 377 largest nonfinancial institutions use derivatives to regularly manage exposure to interest rates, currencies, and commodities.^{xxix}

CAPITAL MARKET BENEFITS

Capital markets refer to activities related either to the transfer of funds from an entity that has excess cash to an entity that needs cash, or a transfer of risk from an entity that wants to shed it to an entity that wants to assume it. Economists generally refer to this activity as intermediation. With respect to savings and investments, the markets are constructed to match those with excess savings

to those who need capital and also to improve the efficiency of that transfer so that each individual entity doesn't need to seek and find one another, create legal agreements, and transfer funds manually. With respect to transfers of risk, capital markets are constructed so that those desiring to mitigate risk and those seeking risk can find each other easily and agree to terms that are largely uniform and intelligible.

The operation of a traditional bank is a simple illustration of how capital markets work. Banks essentially match savers who have excess capital with borrowers who need capital. For example, Mary owns a furniture boutique and needs \$50,000 so she can purchase inventory for the store. Joe has \$50,000 that he wants to safely invest and still know that he can always recover it quickly without risk of loss. The bank will compete with other banks to entice Joe (and thousands of other savers) to deposit his savings with them by offering an attractive savings account interest rate—say 2%. Mary may have many options as to where she can get the business loan, so if the bank wants her business they will have to offer an attractive loan rate, say 5%. Theoretically, if Joe and Mary knew each other they could have arranged the loan directly, but Joe might not be skilled at assessing the credit quality of Mary's business and might worry that if she defaulted, he would lose his money or if he needed his savings for an emergency, that Mary might not be able to instantly repay him. So, the bank acts as a medium to indirectly match Joe and Mary—and the 3% interest spread (5% loan rate – 2% deposit rate) that it earns is compensation for, among other things, assessing and bearing Mary's credit risk and offering Joe liquidity and peace of mind. Thus, everyone is better off.

The stock market is another obvious form of capital market. Perhaps Mary's business has grown and she needs more permanent capital to rapidly expand her store base. She decides to sell equity in her company via an IPO. Joe has \$500,000 he wants to invest in the stock market, and chooses to invest a portion of it with an investment manager that specializes in finding investment opportunities in relatively small but fast-growing retail businesses. The fund manager uses a portion of Joe's investment to buy some of Mary's stock. Again, the market works to match a saver with excess capital with someone who needs the capital.

Derivative exchanges are another important capital market. It turns out that Joe is a farmer who, among other things, grows corn. Early in the crop production cycle, Joe becomes concerned that bumper crops across the country might result in depressed corn prices when he is ready to harvest and sell his corn. To hedge this risk, he goes to the Chicago Board of Trade (CBOT) and buys a corn futures contract that effectively locks in the price he will receive for his corn when he delivers it at the end of the summer. The entity writing the future might be a frozen corn producer that doesn't want to take the risk that a late summer hail storm might wipe out corn crops and cause prices to spike. Another form

of capital market, the CBOT, allows the two parties to essentially hedge each other's risk again allowing everyone to be better off.

Without capital markets it's hard to imagine how large infrastructure projects would get financed. In 2008, a syndicate of banks (again using the savings of people like Joe) agreed to extend \$2.3 billion in financing to enable the first expansion of the Panama Canal since it opened in 1914.^{xxx} Thanks in part to this necessary financing, in 2016 the expanded canal opened, enabling ships 1.5 times the previous Panamax size to pass through its locks, doubling the canal's capacity. As a result of the canal's expanded capacity, global shipping costs have fallen, which should result in global consumers benefiting from lower prices. Panama gets more tax revenue, the banks' shareholders benefited from a profitable loan, depositors benefited from the interest on their savings, consumers get cheaper prices—again, capital markets have dramatically improved the world economy.

CAPITAL MARKET RISKS

While capital markets have made, either directly or indirectly, substantial contributions to improvements in societal welfare, they can also cause damage when capital is misallocated. For capital markets to function properly, providers of capital must be well informed and act in their self-interest when they make a loan or buy a stock. Investors might invest in some risky ventures, but the expectation is that the potential rewards offset the risk. As the perceived risk increases, the price of the capital correspondingly increases and that price mechanism ensures that only projects with appropriate risk-adjusted returns receive the capital. Even at the individual consumer level, if the interest rate on a car loan rises from 2% to 20%, most people are likely to purchase a less expensive car or explore alternative transportation options. Like all exchanges in a free market economy, price is the primary mechanism of allocation. In this section, we will briefly discuss one instance and two potential instances where capital is misallocated, creating an unstable and potentially damaging situation. These situations are the subprime crisis in 2007–2009, the growth of the syndicated loan market, and the structural demand for U.S. government debt.

The Subprime Mortgage Crisis

Unfortunately, as the complexity of the capital markets increases and providers of capital become increasingly removed from the assessment of the risk of their investments, the risk of capital misallocation increases. A prime cause of this has been a trend for intermediaries that arrange capital investments to not bear any of the risk associated with those investments. Securitizations present a clear example of this. As previously described, in a standard securitization, an

originator of loans will accumulate a large pool of those loans and then effectively sell them to the securitization SPV. That sale essentially transfers the risk of loss from making bad loans to the investors of the securitization. The securitization investors recognize this risk, and thus demand that independent third parties—in this case credit rating agencies—review the assets and other aspects of the transaction and provide an opinion on the risk, or conversely, the *safety* of the investment. The highest safety grade issued by Standard & Poor's Corporation (a major national rating agency) is the famous *AAA rating*.

While the involvement and oversight of a rating agency no doubt substantially improves the safety of these financings, the self-interest of a third party who has no capital at risk (and happens to have its fee paid by the promoter of the securitization) is inherently different than the self-interest of a provider of capital that bears the risk of loss if it makes bad lending decisions. A relatively recent example of the consequences of this separation of risk is the subprime mortgage debacle that most acknowledge was a major contributing cause of the 2008 Great Recession.

Without reviewing ancient history, home mortgages were originally made by banks or savings and loans that held the mortgage for its entire 30-year life. Not surprisingly, banks took great care in making sure that the borrower was a good credit risk and that home value substantially exceeded the mortgage amount. Fast forward to the early 2000s when subprime mortgage originations exploded. The originators of these mortgages were typically mortgage brokers who intended from the beginning to sell the mortgages to either a securitization entity or the Federal Mortgage affiliates.¹³ These brokers were compensated on loan volume and not the quality of the loans originated.¹⁴

While the rating agencies recognized that subprime mortgages were riskier than traditional prime mortgages, the agencies had little history of how subprime mortgages performed over various economic cycles. This is because these mortgages were a relatively new asset class. Finally, the investors in the securitizations, even though they were often seasoned mortgage professionals, had little direct knowledge about the quality of the mortgages. These investors generally relied on summary statistics describing the securitization and the *AAA* or *AA* rating issued by the rating agency. While these investors bore the risk of loss,

¹³ See Chapter 8 for a brief discussion on the requirements to sell a mortgage to a Federal Mortgage affiliate.

¹⁴ In fact, mortgage brokers were paid both a commission as well as a *yield spread premium* (YSP) on some loans. A YSP allows the broker to share in the *extra* interest associated with higher interest rate loans made to less creditworthy borrowers, thus incentivizing brokers to originate riskier loans. Often these loans were based on *stated* incomes where there was no verification of the borrower's income, and thus no way to be sure they could afford the loan. For good reason, these came to be known pejoratively as *liar loans*.

they had no involvement in the loan-making decision process. And those who were involved in the loan-making process, bore no risk of loss and were incentivized to make as many loans as possible. Clearly, in hindsight, but probably with thoughtful foresight, this was a recipe for disaster.

At the root, this represented a basic failure of proper capital allocation. If all the risks had been properly assessed, the cost of the subprime loans either would have been substantially higher—thereby reducing the quantity of subprime loans originated—or proper due diligence would have been performed and many applicants would have been denied loans. But because there was a decoupling of risk taking (the making of the loan) and risk bearing (owning the loan), there was a breakdown in the proper operation of the market. As a result, billions of dollars of loans were made inappropriately. When the borrowers of those loans defaulted—sometimes due to an inability to pay the mortgage, other times due to a decline in the value of the property that wiped out the borrower’s equity—the value of the related securitizations fell rapidly and caused investors to question the solvency of the over-leveraged investment banks that held them. This was essentially why Lehman Brothers was forced to file bankruptcy, which precipitated the financial crisis.

The Syndicated Leveraged Loan Market

The decoupling of risk taking and risk bearing also appears to be present in the syndicated leverage loan market, which is another market that has grown rapidly in the last decade and over which many market professionals have concerns. As discussed earlier, in the good old days, banks that made loans to corporate borrowers would carefully investigate or underwrite the loan to assess the probability that it would be repaid because they would hold the loan and bear the risk of loss. Syndicated loans are typically arranged by a relatively small number of money center banks (i.e., the largest in the world). These arrangers are responsible for doing the primary loan underwriting and negotiating the terms of the loan (including important protective covenants), but they then sell the loan in pieces to other investors and seldom keep a meaningful amount on their own balance sheet. The loan purchasers, who are generally sophisticated and experienced, often must rely on an analysis of fairly generic financial statements¹⁵ and the opinion of the rating agency. This environment creates a risk

¹⁵ Historically, when banks made significant loans to corporations, their due diligence investigations would include the review of far more detailed, not publicly available financial information than is generally disclosed by banks in SEC filings. This information would include, among other things, detailed loan performance and loan loss data as well as financial projections. Because syndicated loans are essentially sold publicly, this important nonpublic information is not made available to investors.

that substantial amounts of capital will be misallocated (or at least mispriced) to many borrowers.

In October 2018, former Federal Reserve Chairwoman Janet Yellen, in an interview with the *Financial Times*, spoke bluntly about what she views as troubling developments in the U.S.-leveraged loan market. In that interview, she stated: “There has been a huge deterioration in standards; covenants have been loosened in leveraged lending.” She continued, “You are supposed to realize from the crisis, it is not just a question of what banks do that imperils themselves, it is what they do that can create risks to the entire financial system. That lesson, to me, seems to have been lost.”^{xxxix} Yellen pointed to the increase in covenant-lite loans and increasing leverage of the issuers. Specifically, as of January 2019, approximately 79% of the \$1.2 trillion in outstanding syndicated loans have few or no covenants limiting the borrower’s behavior.^{xxxix} Meanwhile, leverage for these loans reached 6.9× in early 2019, just below the all-time high of 7.0× in Q3 2018.^{xxxix}

U.S. Government Debt

At the risk of taking on a politically controversial topic, an additional example of capital misallocation *may* be occurring in U.S. sovereign debt (i.e., U.S. Treasury bonds or USTs). Because the United States is the largest economy in the world and has been among the most politically stable of the developed nations, the USD is by far the most widely held and used currency on the planet. It is the leading reserve currency—meaning that it is the currency of choice for foreign currency reserves by foreign central banks. In addition, it is the primary currency used in many foreign transactions, including importantly, oil sales. As a result, there are a lot of USD outstanding, and the easiest way to invest a USD is in a UST. A second order consequence of this is that there is tremendous structural demand, on average, for USTs which means the borrowing cost for the federal government is relatively low (in both nominal and real terms), and the borrowing rate is likely lower than it would be if the USD did not hold its unique status as the world’s reserve currency.

Because of this structural demand for U.S. government debt and the low financing cost associated with its debt, there seems to be increasingly less fiscal discipline by the federal government. As of year-end 2018, the federal debt exceeded \$22 trillion, and following the 2017 Tax Cuts and Jobs Act, the U.S. Congressional Budget Office estimated that the U.S. fiscal deficit will grow from \$860 billion per year in 2018 to over \$1.3 trillion per year in 2028. Additionally, net interest payments are estimated to grow from \$316 billion per year in 2018 to \$915 billion per year in 2028.^{xxxix} Citizens seem to be rightly concerned even if policymakers are not. In a March 2018 survey by the Global Strategy Group,

74% of participants agree or strongly agree that the national debt should be among “the President and Congress’s top three priorities.”^{xxxv}

Deficit spending is a contentious subject. Sometimes, for example in 2009 during the depths of the Great Recession, deficits were deemed important to stimulate the economy and reduce unemployment. Additionally, it was argued at the time that borrowing to fund infrastructure improvements will add to the productive capacity of the economy and benefit future generations. But borrowing to fund current consumption that does little to add to the productive capacity of the nation simply shifts a payment burden onto subsequent generations and possibly harms the potential growth rate of the economy.¹⁶

Why is this characterized as a problem of capital misallocation? If almost any other country ran sustained deficit to GDP ratios as high as the U.S., their cost of external debt financing would likely increase substantially. Furthermore, if U.S. deficits were being financed with debt that cost 8% instead of 3%, politicians would likely make fiscal discipline a much higher priority. Governments, like every other person or entity, respond to their cost of capital. Because the U.S. is in the unique and enviable position of holding the world’s reserve currency,

¹⁶ In 2009, economists Carmen Reinhart and Kenneth Rogoff published *This Time is Different: Eight Centuries of Financial Folly*. As the title suggests, this seminal piece collected global data across eight centuries, highlighting that (among other things) history is replete with examples of governments overborrowing and then defaulting, whether the default is explicit via principal reduction or implicit via high inflation. In 2010, Reinhart and Rogoff published *Growth in a Time of Debt*, in which they state, “When gross external debt reaches 60% of GDP, annual growth declines by about 2%; for levels of external debt in excess of 90% of GDP, growth rates are roughly cut in half.” Unfortunately for the authors and policymakers alike, in 2013, Thomas Herndon, then a PhD candidate at the University of Massachusetts, attempted to recreate one of Reinhart and Rogoff’s tables and discovered an excel error whereby only 15 of 20 countries in the 90+ debt to GDP category were included in the average growth calculation. In an interview shortly after the error was made public, Herndon and UMass Professor Michael Ash state, “What we find is that average growth is modestly diminished when countries hit the 90%—as countries approach the 90% public debt to GDP ratio. There’s no cliff.”

Perhaps Reinhart and Rogoff bit off more than they could chew; the growth of an economy is driven by a plethora of factors including the economy’s openness, rule of law and property rights, economic conditions of trading partners, the level of citizen’s education and social mobility, governmental stability, exchange rate regimes, business cycle, fiscal situation, trade balance, and much more. So, attempting to solve for economic growth using the single variable of national debt as a percentage of GDP was likely a fool’s errand. But, the logic is clear and irrefutable even if the data isn’t—all other things equal, a higher debt burden means more tax revenue is diverted toward interest payments and not government programs that may improve economic conditions, such as infrastructure or education. Sadly, the discrediting of the statistical link between high public-debt burdens and poor economic growth has contributed to increasing apathy among policymakers’ view toward high U.S. public debt.

which results in a high demand for USTs, interest rates do not respond to normal market mechanisms and capital may be misallocated.

In summary, capital markets have the potential to create great value in society by matching capital with the best ideas and investment opportunities. As illustrated, when capital markets function properly everyone wins. However, for capital markets to function properly, the price of the capital must properly reflect the risk to which it is being deployed. When the risk pricing mechanism breaks down because *risk taking* becomes separated from *risk bearing*, capital will be mispriced and misallocations will likely occur. Usually those misallocations will not result in something as destructive as the Great Recession, but credit bubbles, another code word for misallocations, have become an increasing area of concern.

MARKET EFFICIENCY AND CAPITAL MARKET FAILURES

While University of Chicago Professor Eugene Fama was not the first economist to make the case that past stock prices are not predictive of future stock prices, he is widely credited for developing and advancing the *Efficient Market Hypothesis* (EMH). The EMH postulates that asset prices reflect all available information. Therefore, an analyst valuing stocks or bonds cannot beat the market by analyzing charts, company balance sheets, google trending searches, or any other source of information, because all of this information is already incorporated into the price of every security. It is for this reason that active stock mutual fund managers net of fees, on average, do not outperform market indexes.

One should be careful in interpreting what the EMH, or the concept of efficiency, really means or implies. First, it does not imply that there is any type of consensus that a particular asset, such as an individual stock, is properly valued. The reality of the market is that every participant probably has a slightly different view of the value of a specific stock. Every time a trade takes place, the seller implicitly thinks the buyer must be a fool for paying too much for the stock (otherwise why would the seller sell) and the buyer must think the seller is equally foolish for not realizing the stock is cheap and likely to increase in value (otherwise why would the buyer buy). So, efficiency is just the temporary equilibrium of all participants' interpretation of the available market information.

Second, the market never has *all* of the information. Investors often think they have unique information that gives them an edge. Consider the stock of a pharmaceutical company with a drug that is undergoing a clinical trial. An investor who is participating in the trial and believes the drug is effective might

buy the stock, but that doesn't mean the market reflects all information. If the company sends a press release two days later announcing positive clinical results, it will lead to complete internalization of the information.¹⁷ However, as a legal and regulatory matter, whether an investor has an unfair information advantage (i.e., trading on insider information) is a significant concern and central to the notion of whether the market is fair.

Finally, the EMH does not imply the price is correct—just that it reflects all available information. This last point is important because it rationalizes how there can be significant changes in market prices without suggesting the prior market price was *wrong*. Consider a market crash. Was the market wrong the day before a crash? No, it just means that new information likely became available that changed investors' outlooks (either for an individual stock or the entire market). For example, articulated changes in Federal Reserve policy will often have significant impacts on market prices, but that doesn't imply the market was wrong the day before the change was disclosed.

If market crashes aren't the result of investor mistakes, what does cause them? (If the authors knew this we would be too busy counting our money to write this book!) There are a number of theories, three of which will be briefly discussed here. Economist John Maynard Keynes believed that market economies were by their nature inherently unstable and prone to recessions in periods of low demand and inflation in periods of high demand and that government intervention was frequently needed to provide stability. Economist Hyman Minsky argued that humans' innate propensity to be lulled into complacency during periods of sustained stability coupled with banks' competitive desire to grow, leads to deteriorating lending standards during times of extended periods of strong growth and few defaults. This fuels asset price appreciation which further reinforces the banks' view that the risk of loss is *de minimis*.^{xxxvi} Then one day something happens that causes everyone in the market to realize that prices are irrationally high (a *Minsky moment*¹⁸) and a massive correction ensues. Statistician Nassim Taleb, author of *Black Swans*, asserts that the problem is that

¹⁷ This rapid internalization and repricing following a press release is in line with the semi-strong EMH, which states that all publicly available information is incorporated into a stock price. By contrast, a weak EMH states that there is no informational value in past price movements because stock prices follow a *random walk*. Finally, the strong EMH hypothesis states that all information, both public and private, is incorporated into the price of a stock. In practice, even the most die-hard of EMH enthusiasts concede that insider information is not always incorporated into a stock price, meaning the strong EMH will remain an academic hypothetical.

¹⁸ The term *Minsky moment* was coined by economist and former PIMCO Portfolio Manager Paul McCulley when describing the Russian financial crisis of 1998, the Fed's response to the 2001 U.S. recession, and later the 2007–2009 global financial crisis.

the market improperly assesses the implications of low probability but high impact events. When such an event occurs (which is not often since they are by definition low probability), the market is essentially “surprised” and reacts dramatically.

SUMMARY AND INVESTMENT IMPLICATIONS

Summary

Modern capital markets match individuals and institutions that have excess capital or risk with those individuals and institutions that lack capital or risk but would like it. The motives of capital market participants typically include the desire to either make an investment that will lead to value creation in the future, increase or forgo current consumption, reduce risk, or increase risk if they feel they are being sufficiently compensated for that risk. Stocks and bonds are financial assets issued by capital market participants. These securities are essentially contracts documenting the transfer of cash to the issuer and specifying the holder’s rights to receive cash flows in the future. Derivatives are also issued by capital market participants; however, while stocks and bonds are generally used to facilitate the transfer of capital, derivatives are primarily used to transfer risk between participants. Financial markets are where individuals and institutions go to trade stocks, bonds, and derivatives. In practice, the terms financial markets and capital markets are largely used interchangeably.

Capital markets are essential to the functioning of a modern economy. In the long run, economic output is determined by the economy’s stock of capital and overall productivity. Financial markets enable both people and businesses to increase their capital, both physical and mental, more than would be the case should these markets not exist. Therefore, we are all the beneficiaries of these markets as they facilitate a more optimal allocation of capital and risk in the economy. However, for markets to work properly, the price of capital must efficiently reflect all associated risks. When the pricing mechanism breaks down, capital can be misallocated, sometimes with disastrous social and financial consequences.

Finally, markets are *efficient*, meaning the prices of assets include all publicly available information—and when new information becomes available, prices rapidly adjust. This doesn’t mean that boom-bust cycles are less likely to occur owing to the financial market’s efficiency. Rather, it simply means that it is very difficult to outperform the return of the broad stock and bond markets.

Investment Implications

- Capital markets exist to match entities with excess capital and those that desire additional capital as well as to match entities with an aversion to risk and those seeking risk. Individuals, corporate executives, and senior government officials should utilize these markets to borrow if and only if they are using this capital for productive means. In other words, prudent issuers of debt or equity should only deploy capital on projects that will generate future cash flows that provide appropriate risk-adjusted returns to investors.
- Debt investors should be cognizant of the borrower's motives for financing and not simply the borrower's willingness and ability to service additional debt. Additionally, investors should be leery of lending to individuals, institutions, and governments that are utilizing the capital markets to merely increase current consumption and not future productivity.
- It is wise to always have a contingency plan should the economy suddenly contract or the value of investments significantly fall. Regardless of whether Keynes, Minsky, or Taleb properly diagnosed the causes of financial dislocations, periods of significant financial instability and heightened volatility are reoccurring and nearly impossible to forecast.
- As markets are efficient, investors are wise to minimize trading and management costs of their investments. In Chapter 5 we will go into greater detail regarding investment manager fees and the debate of active versus passive management.

Appendix Table 1.1 Options, futures, forwards, and swaps

Derivative	Options	Futures	Forwards	Swaps
Definition	The right (but not the obligation) to buy (call) or sell (put) a security at a given price (the strike) on or before a certain time (the contract maturity).	A legal agreement to buy or sell a specific asset at a given price (the strike) at a specified time in the future (the maturity).	A legal agreement to buy or sell a specific asset at a given price (the strike) at a specified time in the future (the maturity).	A legal agreement to exchange cash flows based upon two separate financial instruments or indexes for a given tenor. The most common swap is an interest rate swap, whereby one party pays a fixed interest rate (the fixed leg) in exchange for an interest rate that varies (the floating leg), often with another index such as 3 month USD LIBOR. The cash exchanged is the interest rate differential between the fixed and floating legs multiplied by the notional value of the swap.

Continued

Derivative	Options	Futures	Forwards	Swaps
Listed or Over-the-counter Trading	Both. Listed options trade on exchanges and are standardized contracts whereas over-the-counter options do not trade on an exchange and are not standardized (bespoke).	Listed. All futures contracts are standardized for quality and quantity of the underlying asset and are traded on an exchange.	Over-the-counter. Forwards contracts are not standardized and are not traded on an exchange.	Over-the-counter. Swap contracts are not standardized and are not traded on an exchange.
Cash or Physical Delivery Settlement	Both. Most options are physical settled, meaning the transfer of the underlying security occurs should the option be exercised by the holder of the option. Some options are cash settled, meaning a dollar value of the option is calculated, based on a predetermined formula, and transferred from one party to the other.	Both. Most futures contracts are cash settled, meaning the value of the future is debited from one account and credited to another account on the maturity of the future. A small percentage of futures are physical settled, meaning the underlying index or commodity (whether it be a stock, oil, or corn) is physically transferred from the short (seller) to the long (buyer) of the contract.	Both. Forward contracts are highly customizable between parties and are often settled through either cash or physical delivery.	Cash. However, given the bespoke nature of swaps, nothing precludes counterparties to settle with physical securities; however, this is not common.

Continued

Derivative	Options	Futures	Forwards	Swaps
Use	<p>Speculation: Allows the holder to speculate as to whether a security, index, or commodity will rise or fall without owning the reference security or index. If a speculator anticipates the underlying security will rise (fall), she may purchase (sell) a call or sell (purchase) a put.</p> <p>Hedge: Allows the holder to protect themselves, in part or in whole, against a appreciation or depreciation in the value of the security, index, or commodity. If the hedger owns (is short) a security, he may hedge their exposure by purchasing (selling) a put or selling (buying) a call.</p>	<p>Speculation: Allows the holder to speculate as to whether an index or commodity will rise or fall without owning the reference index or commodity. If a speculator anticipates the index or commodity will rise (fall), he may purchase (sell) a futures contract.</p> <p>Hedge: Allows the holder to protect themselves, in part or in whole, against an appreciation or depreciation in the value of the index or commodity. If the hedger owns (is short) an index or commodity, he may hedge his exposure by selling (purchasing) a futures contract.</p>	<p>Speculation: Allows the holder to speculate as to whether an index or commodity will rise or fall without owning the reference index or commodity. If a speculator anticipates the index or commodity will rise (fall), he may purchase (sell) a forward contract.</p> <p>Hedge: Allows the holder to protect themselves, in part or in whole, against an appreciation or depreciation in the value of the index or commodity. If the hedger owns (is short) an index or commodity, he may hedge his exposure by selling (purchasing) a forward contract.</p>	<p>Speculation: Allows the holder to speculate as to whether an index, commodity, currency, or interest rates will rise or fall. The speculator needs to post a little, if any, initial margin. If a speculator anticipates interest rates will rise, she may enter a swap whereby she receives a floating interest rate and pays the fixed interest rate. She will benefit should interest rates rise above the fixed leg.</p> <p>Hedge: Allows the holder to protect themselves, in part or in whole, against an appreciation or depreciation of an index, commodity, currency, or change in interest rates. If the hedger owns (is short) an index, he may hedge his exposure by selling or paying (buying) the return of that index and buying or receiving (paying) a fixed or floating cash return.</p>

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